Topeka News

Volume 3, Issue 4 November, 2009

Winter Weather Forecasting By Sally Pavlow, Meteorologist

"The trouble with weather forecasting is that it's right too often for us to ignore it and wrong too often for us to rely on it." ~Patrick Young

Forecasting winter weather events is one of the biggest challenges that meteorologists face. Forecasters use different tools and methodologies to come to the best possible conclusion, based on the available information. Here's a look at one of the more important tools used for winter weather forecasting; the **Skew-T**.

A "Skew-T" depicts a snapshot of the atmosphere, over a point, at one particular moment in time. Across the country, twice each day, upper air balloons are sent into the atmosphere to sample temperature, dew point, wind direction and wind speed. The National Weather Service has 92 sites in North America and the Pacific region and another 10 sites in the Caribbean. One of those sites is right here in Topeka. A Skew-T can be plotted with actual data collected from the atmosphere or can be plotted

NWS Upper Air Observation Sites (in Blue)

December to February Temperature/Precipitation Outlook

The Climate Prediction Center (CPC) has issued their three month temperature and precipitation outlooks for the United States for the upcoming December, January, and February period. El Nino conditions have been evident over the tropical Pacific the past few months, and should persist through the winter months. These conditions are expected to persist through the winter months. And El Nino pattern typically bring slightly above normal temperatures to the northwest and north central United States, when averaged through the winter season, and near normal precipitation. A cooler, wetter pattern results across the southern United States. This forecast is reflected in the CPC graphics displayed below. The temperature outlook, valid for the period between December and

Continued on Page 3...

Special Points of Interest

- What's the Winter Outlook for Northeast Kansas?
- NWS-Topeka Out and About
- How Many Tornadoes has NE Kansas had so far in 2009?

Inside this issue:

NWS-Topeka Outreach Events 4

Forecaster Communication 5

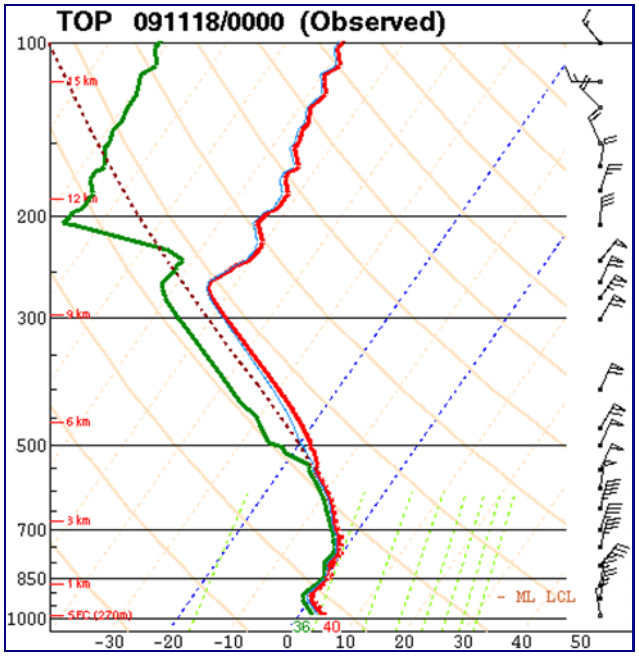
2009 Tornado Count 6

Winter Weather Forecasting (from page 1)

from numerical based forecast models. Forecasters use these soundings to find where there is moisture, dry air, cold air, warm air and other parameters to help determine what precipitation type can be expected.

Forecasting Precipitation Type

Using a combination of observed and forecast soundings, forecasters look for specific details that will point to a particular precipitation type.



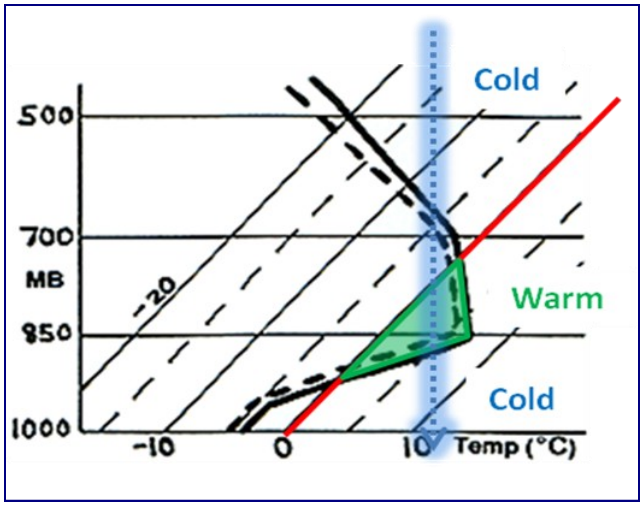
Observed Sounding from 00Z Topeka, KS Nov. 18, 2009

Freezing Rain

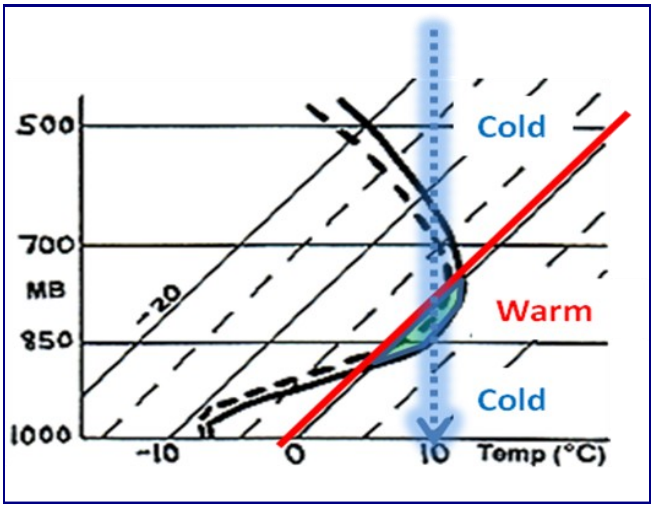
According to the American Meteorological Society's Glossary of Meteorology, freezing rain is defined as "rain that falls in liquid form but freezes upon impact to form a coating of glaze upon the ground and on exposed objects". Example 1 on page 3 illustrates a typical freezing rain sounding. The sounding shows temperature as a solid black line and dew point as a dashed black line. The solid red line is where the temperature is at 0°C (32°F). The green shaded area is where a layer of warm air exists. Imagine a drop of water falling through the atmosphere (illustrated as a blue dotted line). It first falls through cold air (it's on the left –cold- side of the red line) and is in a frozen state. As the droplet continues to fall, it encounters a layer of warm air (the green shaded area on the right side of the red line) that can be several thousand feet thick. This is enough warm air to turn the droplet into liquid again. Continuing to fall toward the ground, the droplet then encounters a below freezing layer. This last surface based layer of below freezing temperatures is what causes the droplet to freeze upon impact with the ground or other exposed objects.

Sleet

Once again consulting the Glossary of Meteorology, sleet is defined as "a type of precipitation consisting of transparent or translucent pellets of ice". Example 2 depicts a sleet sounding. The warm layer (green shaded area)



Example 1: Freezing Rain Sounding



Example 2: Sleet Sounding

Winter Weather Forecasting (Continued from page 2)

is much smaller, or more shallow than the layer illustrated in the freezing rain sounding. Also of note, the layer of cold air starting at the surface is much deeper than observed on a freezing rain sounding. The droplet follows a similar path as the freezing rain droplet, but since the warm layer is more shallow, the droplet can't quite liquefy and remains partially frozen. This droplet then refreezes somewhat and falls to the ground as an ice pellet or sleet. Sleet is typically spherical, and usually bounces upon impact with the ground.

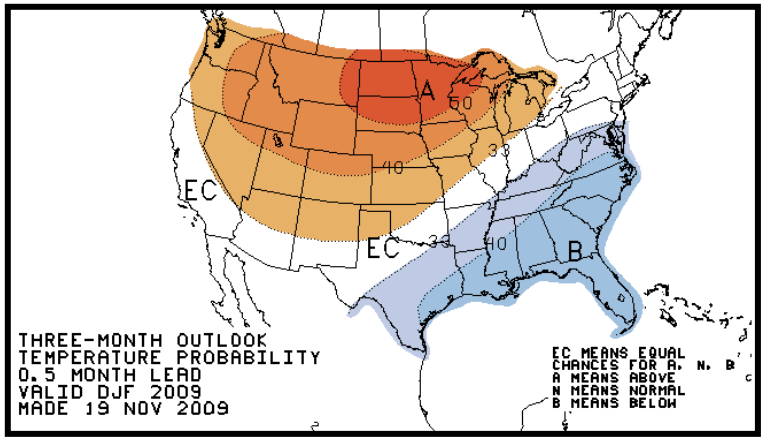
Snow

Snow is precipitation that is completely frozen. Ice crystals will not encounter any above freezing air in their decent through the atmospheric column. The sounding will therefore depict a below freezing atmosphere, through the entire column. Once forecasters determine that precipitation will be all snow, the next question revolved around determining how much snow will fall. Snow amounts are determined through various sources. Forecasters must consider the amount of available moisture, how cold temperatures will be through the atmospheric column, the type of snow that is expected to fall (heavy, wet snow or light fluffy snow), surface temperatures and whether snow will stick to the ground in the first place, and how strong the weather system that will produce the precipitation will be. Determining snow amounts is complicated and forecasters work diligently in order to come to the best possible conclusion.

With so many factors contributing to the end result, even a 25 mile or less difference in the track of a storm system can make a difference between rain, freezing rain, sleet or snow falling at a location. Forecasters are challenged by each winter storm that moves through the area, but enjoy the challenge of making a correct forecast.

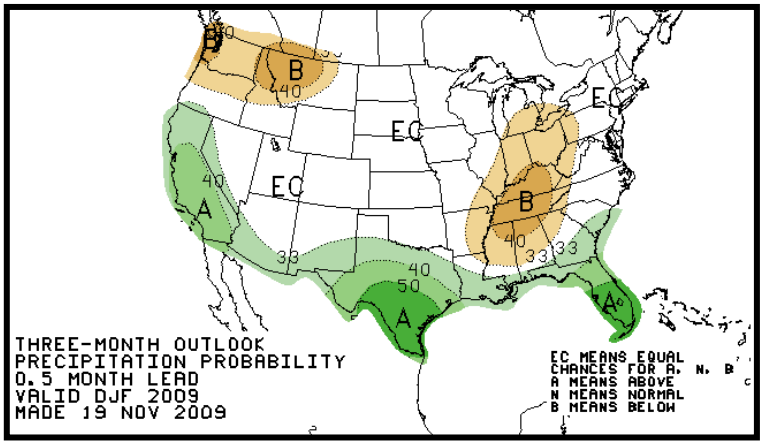
Winter Outlook (Continued from Page 1)

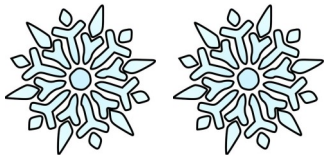
February depicts that there is a slightly above average chance for warmer than normal temperatures averaged through the period, and lesser chances for near normal or below normal temperatures. Small scale temperature variations are still likely through the period. A few days with very cold temperatures, and some more mild days are still expected through the period. On the precipitation front, there are equal chances for above average, near average, and below average precipitation for the period. This means this is no clear indication whether or not this year will be anomalous precipitation-wise across northeast Kansas. The average October to April total snowfall at Concordia is 22.6" (Tabulated from the 1948/1949 winter season through 2008/2009. Some yearly data is missing.) The average October to April total snowfall at Topeka is 19.4" (Tabulated from the 1887/1888 winter season through 2008/2009).



Dec-Jan-Feb Temperature Outlook

Dec-Jan-Feb Precipitation Outlook





NWS-Topeka Outreach Events, September-November 2009

The staff at the National Weather Service in Topeka has had a busy few months both inside and outside the office. Our office mission states that our employees are "A team of professionals providing focused, flexible, impact based services." To accomplish this mission, we not only have to issue warnings and forecasts to help protect life and property, but also must reach out to the public to make sure our message is understandable. We also spend time trying to improve our services by participating in training. Some of the recent events the staff here has participated in include:

"The National Weather Service was on hand to answer questions, and build relationships with the Emergency Management community."

Cooperative Observer Open House, September 3rd, 2009.
The open house was held to recognize the importance of the Cooperative Observer Program to the NWS and the general public. Cooperative Observers here in northeast Kansas and across the country provide data that is used in many products produced by the NWS. Twenty-two observers attended the event, several of whom brought along family members. The observers participated in a meet and greet with other observers and the NWS staff, were treated to a BBQ, went on a tour of the NWS office, and were able to watch a special 19Z release of a weather balloon. One award was also presented at the event. Lowell J. Jones from site Fostoria 7NW received the John Campinus Holm award, which was created in 1959 to honor cooperative weather observers for outstanding accomplishments in the field of meteorological observations. No more than twenty-five Holm awards are given annually, as this is the NWS's second highest award and based on merit. Mr. Jones was also awarded the Edward H. Stoll Award for 50 years of service at a community festival earlier in the summer. Four other Holm award winners were in attendance—Alan Winkler of McFarland, KS, Melba Bruce of Minneapolis, KS, and Bill and Shirley Driscoll of Rossville, KS.

Bill Newman, Data Acquisition Program Manager addresses the crowd at the Coop Observer Open House

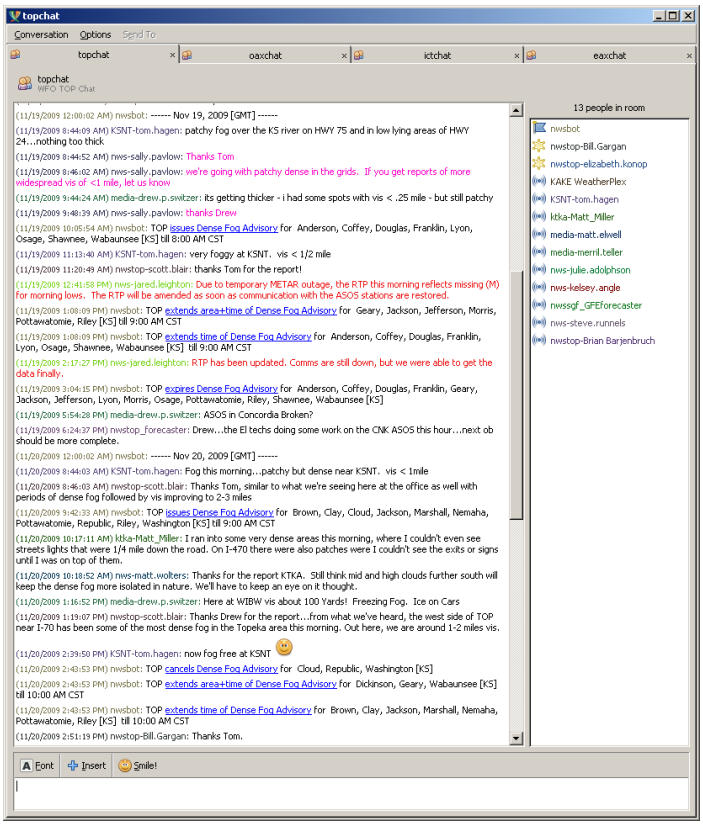
KEMA Conference, September 16-18th, 2009.
The Kansas Emergency Management Association (KEMA) hosts a conference each year for all Kansas Emergency Managers, and personnel from various state, federal, and volunteer agencies. This conference allows these decision makers and emergency responders to communicate with one another, learn about new technologies, and discuss operational tactics. The National Weather Service was on hand to answer questions, and build relationships with the Emergency Management community.

Girls at Women in Science Day listen to featured speaker Julie Adolphson.

Chili Cook-Off and Aviation Seminar, October 6th, 2009. The aviation seminar offered meteorologists a chance to review best practices regarding Terminal Aerodome Forecasts (TAFs), learn new techniques for fog forecasting, and compare meteorologist verification scores against computer

Forecaster Communication

The National Weather Service has 122 offices located in all 50 states, Puerto Rico, and Guam. Ten to 12 meteorologists are employed at each of the offices. These meteorologists issue forecasts for only their small "county warning area" or CWA. Here at the NWS in Topeka, our CWA encompasses 23 counties in northeast Kansas. Five other NWS offices issue forecasts for the rest of the state. The meteorologists at each of these offices, for the most part, look at the same forecast model information, observations, and other meteorological information that helps them to create the daily forecast package. Every meteorologist strives to put out the best forecast possible, but must be cognizant of the fact that weather patterns do not follow the defined county warning area boundaries! Therefore, communication is of the essence to forecasters in adjacent CWAs as weather making storm systems move across the U.S. There are several ways in which this occurs. Meteorologists always have the option of making a phone call to an adjacent office. This is especially important when critical information, such as details regarding a severe thunderstorm passing from one CWA to the next, needs to be shared. Second, forecasters have a variety of chat software to monitor. NWSchat is open to the NWS, the media, emergency managers, and some in academia to coordinate and collaborate critical information. 12planet is an "in-house" coordination and collaboration tool through which NWS offices, River Forecast Centers, and national centers like the Storm Prediction Center and Hydrometeorological Prediction Center. Communication amongst NWS meteorologists and others makes for a better forecast.



The NWSchat window. Members of the NWS, media, emergency management community, and some colleges and other partners participate.

2009 Tornadoes (Continued from Page 6)

Ended: 2:55pm CDT
4.5 N Beattie
Path Length: < 1 Mile
Maximum Width: 25 Yards
Deaths: 0 Injuries: 0
EF-Scale Rating: EF-1

Tornado 6

June 20—Coffey County
Began: 6:10pm CDT
4 WSW Waverly
Ended: 6:10pm CDT
4 WSW Waverly
Path Length: < 1 Mile
Maximum Width: 25 Yards
Deaths: 0 Injuries: 0
EF-Scale Rating: EF-0

Tornado 7

June 20—Franklin County
Began: 7:10pm CDT
1 SW Princeton
Ended: 7:12pm CDT
0.5 W Princeton
Path Length: 1 Mile
Maximum Width: 25 Yards
Deaths: 0 Injuries: 0
EF-Scale Rating: EF-0

Tornado 8

July 28—Nemaha County
Began: 1:20pm CDT
3.2 SSW Centralia
Ended: 1:21pm CDT
3.2 SSW Centralia
Path Length: > 1 Mile
Maximum Width: 25 Yards
Deaths: 0 Injuries: 0
EF-Scale Rating: EF-0

Additional information regarding these tornadoes

The June 20th tornado near Waverly. Photo by Darin Brunin.

National Weather Service
1116 NE Strait Avenue
Topeka, KS 66616

Phone:
1-800-432-3929

Web:
www.weather.gov/topeka

E-mail:
w-top.webmaster@noaa.gov

Topeka News

2009 Tornado Count

The traditional severe weather season for northeast Kansas occurs between the months of March and June. The average number of tornadoes that occur in the NWS-Topeka County Warning Area (between 1999 and 2008) is 15. Only 8 tornadoes were reported in 2009 (thus far), all of which were rated an EF-0 or EF-1 on the Enhanced Fujita scale. A more detailed summary follows. A special thanks to KU student volunteer Lindsay Dennison for helping with the 1999-2009 tornado summary project.

Tornado 1

March 24—Nemaha County
Began: 6:33pm CDT
3 W Oneida
Ended: 6:45pm CDT
5 NE Bern
Path Length: 8.5 Miles
Maximum Width: 25 Yards
Deaths: 0 Injuries: 0
EF-Scale Rating: EF-1

Tornado 2

May 13—Coffey County
Began: 5:52pm CDT
9 NE Burlington
Ended: 5:52pm CDT
9 NE Burlington
Path Length: < 1 Mile
Maximum Width: 25 Yards
Deaths: 0 Injuries: 0
EF-Scale Rating: EF-0

Tornado 3

May 13—Coffey County
Began: 6:00pm CDT
6 SW Harris
Ended: 6:00pm CDT
6 SW Harris
Path Length: < 1 Mile
Maximum Width: 25 Yards
Deaths: 0 Injuries: 0
EF-Scale Rating: EF-0

Tornado 4

June 17—Washington/ Marshall Counties
Began: 2:20pm CDT
4.5 N Hanover
Ended: 2:33pm CDT
5.5 NE Bremen
Path Length: 8 Miles
Maximum Width: 25 Yards
Deaths: 0 Injuries: 0
EF-Scale Rating: EF-1

Tornado 5

June 17—Marshall County
Began: 2:55pm CDT
4.5 N Beattie

NWS-Topeka Outreach Events (Continued from Page 4)

guidance. The seminar was highlighted by a chili-cook off. Five employees submitted chilis—from a mild chili verde to a sweat-inducing beef chili. TV meteorologists from KTKA, KSNT, and WIBW in Topeka served as judges for the event—and declared a five way tie for first place.

Women in Science Day, October 8th, 2009. The third annual event was held at Washburn University in Topeka. This day-long event was held to inspire and encourage local seventh and eighth grade girls to pursue educational choices, and eventually careers, in the math and science fields. Julie Adolphson, the Meteorologist in Charge at the National Weather Service in Kansas City/Pleasant Hill was the featured speaker. During the afternoon, the girls were able to enjoy the sciences first hand by participating in a variety of labs. Topics included geology, chemistry, architecture, archaeology, biology, and physiology.

GIS Day, November 18th, 2009. GIS Day is a nationwide effort to promote awareness of Geographic Information Systems (GIS). Events were scheduled across the country for the event. The NWS in Topeka got involved with the GIS Day activities at the University of Kansas. There, GIS-savvy employees staffed a booth that promoted GIS services offered by the NWS. Wendy Pearson, a Hydrologist in the Integrated Service Division at the NWS Central Region Headquarters, also gave a presentation on a Flood Inundation Mapping project currently underway in Iowa and Indiana.